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THE GREAT CONSTRUCTION PROJECTS OF COMMUNISM

Subjugating the Desert

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A YEAR AGO, on September 12, 1950, the historic decision of the Soviet Government was published, providing for the construction of the Main Turkmen Canal from the Amu Darya to Krasnovodsk, and for the irrigation of the southern areas of the Caspian lowlands in Western Turkmenistan, the region of the lower Amu Darya, and the western part of the Kara Kum desert. This was a bold and majestic plan for the subjugation of the sultry deserts of Central Asia.

For the first time in the history of hydro-engineering, four vitally important problems—irrigation, water supply, power and transport—are to be solved concurrently and in

part of one scheme. The waters of the Amu Darya will feed potentially fertile regions which now lie scathed beneath a burning sun, will awaken them to life, and turn sandy and saline wastes into flourishing fields and orchards. The plan envisages the irrigation of 1,000,000 hectares of land (chiefly for the growing of cotton) and the bringing of water to about 7,000,000 hectares of pasture land. Trees will be planted on nearly 500,000 hectares of desert to serve as protective belts and to help fix the sands. The industrial plants, railways, towns, settlements and villages of Western Turkmenistan will receive all the water they need through giant mains,

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totalling one thousand kilometres in length. The three hydropower plants to be built on the canal and the river itself in connection with the dams will have an aggregate capacity of 100,000 kilowatts. Lastly, motor ships and strings of barges will sail by the new waterway through the very heart of the Kara Kum desert—from the Caspian Sea to the lower reaches of the Amu Darya and the Aral Sea.

These miracles will be worked by water. The Main Turkmen Canal will represent a huge broad river, 1,100 kilometres long. It will carry a flow of 350-400 cubic metres of water per second—as much as the Dnieper does at Kiev in the summer months. Moreover, the flow can be subsequently increased to 600 cubic metres per second.

Where will this mass of water come from?

The "Volga of Central Asia"

The Turkmens have dreamed for centuries of the day when the parched soil of their country would be sated. They knew that the waters of the Amu Darya were ample enough to vivify and transfigure the desert.

The Amu Darya—known to the ancient Romans, Greeks, Arabs and Chinese under various names—the Djethun, the Oxus, the Potsu—is a powerful and peculiar river.

Because of its length and water volume, it is often called the "Volga of Central Asia." It rises near the borders of China and India, in the summits of the Pamirs, which attain an altitude of 5,000 metres. Its total length is 2,500 kilometres. In its first thousand kilometres it flows through mountains, and is known as the Panj. Here it serves as a natural boundary between the Soviet Union and Afghanistan. Here, too, it receives the Ghund, Bartang, Vaktish, Kafirnahan, Surkhan Darya and a number of other tributaries.

Below the town of Termez, the Amu Darya leaves the mountains for the vast desert wastes of the Kara Kum and Kizil Kum. It transects them without receiving a single tributary, nor any increment from atmospheric precipitation, which is extremely scanty here. In fact, it loses one-fifth of its water, owing to evaporation, filtration and withdrawals for irrigation. Nevertheless, it has still enough left to carry and empty into the closed basin of the Aral Sea some 60,000 million cubic metres of water in an average year.

If we were to look down on the Kara Kum desert from a sufficient elevation, we should clearly discern to the west of the Amu Darya delta dried-up river valleys stretching towards the huge Sarykamish Depression (150 kilometres long, 100 kilometres broad, and about 100 metres deep). In some places these valleys are choked with sand, in others they cut deep into the soil. In the west, the Sarykamish Depression is connected with the Uzboi—an old dried-up river channel excellently preserved to our day with its clearly distinguishable banks, terraces of various height, and characteristic alluvial deposits. The Uzboi stretches in a southwesterly direction to the Caspian Sea.

It is a strange and unusual spectacle, and one that has always attracted investigators. The conjecture has been frequently hazarded that in ancient times the Amu Darya flowed through the Uzboi, and only later turned into the Aral Sea. But geographical and geological investigations have shown that the Amu Darya, like the Syr Darya and other Central Asian rivers, emptied into the Caspian only in the early Quaternary period, when the Aral

Sea was still nonexistent. When that sea was formed the Amu Darya began to flow into it, and only sent part of its waters, through side channels, into the Sarykamish Depression. When the depression was filled to overflowing, the Uzboi was one of the streams that broke out of it, working its way in a southwesterly direction and eating out the typical river channel that now marks its course. But climate changed, the amount of water flowing into the Sarykamish Depression through the steves of the Amu Darya diminished, and the Sarykamish lake gradually dried up. The Uzboi river likewise disappeared, disintegrating into isolated saline lakes separated by long stretches of dry bed.

So much for history. But for man, of course, the most important thing is that the Uzboi has come down to us from ancient times in the shape of an excellently preserved, though dried-up, waterway, laid by nature itself through the very heart of the desert.

The idea of turning the waters of the Amu Darya into Southwestern Turkmenistan and bringing life back to the deserts has agitated the minds of men from times of old. In 1713, Khoja Napes, a Turkmen notable, came to see

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Peter I. He wished to acquire the 'bar' with a project of state importance. "The river," he said, "can be turned back into its former channel, and if the Russians undertake this, they will have the help of the Turkomans." Three years later, Peter ordered the fitting out of an expedition under Prince Belovitch-Cherkassky. The latter's instructions were to travel to the Khan of Khiva as an ambassador, on his way to follow the course of the river and study it carefully, and to decide whether it could be diverted into its old channel.

This expedition met with a sad fate: all its members perished. Investigations of the Uzbul and Amu Darya were not resumed until a century and a half later, when another expedition was sent out in 1873 under General Glukhovsky, and made a topographical survey of the Uzbul. This originated the first project for diverting the Amu Darya into the Caspian and creating a navigable waterway through the desert. Since then numerous other investigations were undertaken and projects drawn up by various individuals and organizations, but in tsarist times they all met with the same fate and were soon forgotten.

Only with the rise of our socialist state has it become possible to realize this age-old dream of the people. The grand task of joining the Amu Darya with the Caspian and utilizing vast quantities of water, which are now wasted, to irrigate deserts has been boldly tackled by the Soviet people.

The Path of the Canal

The best route for the Main Turkmen Canal is still being studied. Two variants have been chosen as being the most feasible, and are now under examination. According to the first, the canal will start at the headland of Tash-Tash on the Amu Darya, near the town of Nukus, skirt the Sarykamish Depression, cross the Kara Kum desert, and then pass through the Uzbul channel to the waterless areas of Western Turkmenistan. The second project proposes to utilize the dried-up channels of the Kunya Darya and Daudan (ancient sleeves of the Amu Darya) and the upper part of the Uzbul, and then, possibly, to carry the canal on through the sandy valleys and "dry-kyr" (low, sandy-clay plateaus) which stretch through the desert in a southwesterly direc-

tion to the Caspian lowland. Geological surveys are now in full swing along the whole route of the canal, and it will soon be possible to determine the most feasible and expedient route on each section. The second year of the project will see the actual construction work developed on a big scale.

Whichever of the two variants is chosen, the Sarykamish Depression will be avoided, for it has been calculated that it would take the Amu Darya at least fifteen years to fill it. We have no right to wait so long, and don't intend to: six years from now motor ships will be leaving Nukus to sail down the canal to Krasnovodsk!

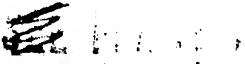
And whichever variant is chosen, a dam will be built on the Amu Darya at Tash-Tash, together with other big hydrotechnical works (power stations, locks, filtering beds, a 50-kilometre dyke, etc.). Other dams and spacious reservoirs will be built along the whole route of the canal, together with power stations, branch irrigation canals, giant water mains—in fact, the whole colossal aggregate of works envisaged by the master plan.

At the headland of Tash-Tash (which means "Stone Cap") the Amu Darya narrows

to a width of 600 metres. Here its channel will be blocked by an earthen dam. It will raise the water only five or six metres above the minimum level, in order not to cause too extensive inundation. Part of the dam will be built of concrete, through which the surplus water will flow.

In spite of the relatively low pressure, the works at Tash-Tash will present a most complicated engineering problem. During flood-time, the water flows with tremendous speed and will tend to wash away the fragile banks; the river carries an unusually large amount of quicksand and silt (from 3 to 12 kilograms of solid matter per cubic metre); in addition, shooting and ice blocks will have to be reckoned with.

The carrying of the canal through the sands of the Kara Kum will also present no little difficulty, as indeed will all the other works. If the first variant is chosen, the shifting sands which stretch from the ruins of Shah-Senem fortress for a considerable distance will have to be coped with; a 50-metre dam, a power station and a navigation lock will have to be erected at the Bargin well, on the Uzbul, and another dam, 30 metres high, a power station and a lock at Kala-Yashan, 100 kilometres

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lower down. Nor should it be forgotten that the Burgun and Yashkan works will be located in the heart of the Kara Kum, remote from any railway. In the last section of its route—the Krasnovodsk end—the canal will pass through an artificial channel, and here two dams will be required. The second variant will also involve the building of a number of dams and dykes (to prevent diversion of the water from the Uzboi to the Sarykagash Depression), the traversing of ranges of sandhills, and considerable excavation of artificial channels.

Scale and Tempo

The best idea of the scale of work involved is given by the figures, although, it is true, they are still preliminary estimates. Four hundred million cubic metres of earth will have to be excavated. This work, of course, can be performed in so short a time (five years) only thanks to the excellent machines we produce: high-power excavators with 14-cubic metre shovels, scrapers, tractors, hauling vehicles and hydromechanisms. From two to two and a half million cubic metres of

soil fertility to 800,000 hectares of land in the lower part of the Amu Darya, and to 500,000 hectares in the Caspian lowland in Western Turkmenistan. Amu Darya water will be directed into the fields through large arterial canals and a ramified network of irrigation ditches.

This will create unparalleled prospects for the growing of valuable fine-staple cotton in the lower areas of the Amu Darya. The Caspian region of Western Turkmenistan will become the country's second main source of cotton supply.

Average cotton yields vary considerably in different countries, ranging from 4 metric centners per hectare in India, 9 in the United States, 16 in Egypt, to 20 in the Soviet Union. The Main Turkmen Canal will help to raise this latter figure by at least 50 to 100 per cent, the reason being that Amu Darya water contains nine times as much potassium and one and a half times as much phosphorus as the famous waters of the Nile, and, what is more, the climate of this region is eminently suitable for cotton raising. The new source of

concrete will have to be laid (in about four years). To do so, we shall build automatic concrete-making plants, of the type which is now so splendidly proving its worth on the construction of the Volga-Don Canal. The canal will involve the laying of from 4 to 5 million cubic metres of stone. To haul the stone from the quarries by rail alone will require over 400 railway tracks a day. Three hundred kilometres of railway and 1,500 kilometres of road will be laid in the canal zone.

Such will be the scale and tempo of the work now begun. For purposes of comparison, we give the following short table:

Canal	Length	Width	Depth	Volume
Panama	80	22	4	32
Suez	110	25	4	33
Main Turkmen	1,200	100	7	840

Transforming the Desert

The irrigation of extensive areas of Central Asian desert is one of the major objectives of the canal project. It is planned to re-

supply will provide about an additional two million tons of first-grade cotton a year.

Frost and snow are almost unknown in Western Turkmenistan, and, with the water supplied by the Main Turkmen Canal, the conditions will be created for the growing of olives, figs, pomegranates, persimmons and—in the southern part—dates.

The soil will be capable of yielding two harvests a year. The new sterile desert will become an area of highly fertile fields and orchards.

The bringing of water to another seven million hectares of desert will create superb prospects for the development of animal husbandry. It will be possible to pasture cattle nearly all the year round, and to gather three or four hog stups a year. The herds and flocks will grow immensely: the number of sheep alone will be increased sixfold.

The supply of water to industrial plants, towns and remote villages will radically change the manner of life of the people and facilitate production. The water will be piped through large mains, with a total length of one thousand kilometres, at the rate of twenty cubic metres per second. When the canal is built the inhabitants of Krasnovodsk will soon

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forget that their fresh water had to be brought by steamer from Balu on the other side of the Caspian.

Western Turkmenistan contains vast deposits of minerals, including oil; but their exploitation has been gravely hampered by lack of fresh water. Extraction of the chemical salts contained in such huge abundance in the waters of the Gulf of Kara-Bogaz-Gol has also been retarded for the same reason. The Main Turkmen Canal will give a fillip to the oil and chemical industries.

Power and transport development will change the face of these desert areas. Hydro-electric stations with an aggregate capacity of 100,000 kilowatts will provide cheap power for the factories and farms of the Turkmen and Kara-Kalpak Republics. Electric tractors will be freely used, and cotton and other industrial crops will be harvested with the help of electrically-driven machines.

The Main Turkmen Canal will be an important transport artery, carrying grain, mineral fertilizers, machinery and farm equipment from the Caspian, and agricultural produce and the products of the manufacturing industries, which cheap power will help to develop in these parts, from the lower reaches of the Amu Darya. The port of Krasnovodsk, the "gateway to Central Asia," will become a great freight-redirecting centre. Passengers will be able to sail from Moscow, the capital of our country, to Tash-Tash and Aralsk without changing steamer. When the Main Turkmen Canal is completed, Moscow will become a port of six seas.

All along its route, the canal will be protected from sandstorms and scorching winds by a powerful green barrier of white acacia, ash, poplar, mulberry, apricot and trees of other sturdy and long-lived varieties. Towns and hamlets will be surrounded by green belts. The very climate will change.

And all this within only six years.

State of the Work Today

Not so long ago I had occasion to traverse the whole course from Tash-Tash to Krasnovodsk. Our exploring party travelled by motor car, and at that time we could still form only a rough idea of the future route of the canal. Here and there we saw the ruins of ancient

fortresses and abandoned nomad camps. We made our way to the well of Yahoda by compass, with not a trace of a road and not a soul to be seen anywhere. Every now and again we had to dig our ears out of the sand, or lay a road for them with bunches of saxaul, and in some places even cut a track through the high summits of the sand hills. At last we reached a precipice 30 metres deep, and below us lay the ancient, silent and petrified channel of the Uzboi.

Yet on September 12, the anniversary of the publication of the Soviet Government's decision to build the Main Turkmen Canal, V. Eristov, chief engineer of Central Asian Hydropower Development, had the following to say in an article in the newspaper *Izvestia*:

"Thousands of prospectors and scientific workers from the Office of Hydroengineering, the Ministry of Geological Survey, the Ministry of Forestry, the Academy of Sciences of the U.S.S.R. and the Academies of Sciences of the Uzbek, Turkmen and Kazakh Republics are today at work in the Kara-Kum desert all the way from Amu Darya to Krasnovodsk and Kizil Arvat... At the site of the Tash-Tash dam, preparations for the construction work are in full swing. Stone, sand, clay and lime quarries have been located, and one near Hodjeili is already in operation. It is equipped with a power plant, mobile compressors, excavators and tip-trucks. Blasting operations have begun. Another and much larger quarry is being opened in the Sultanuzdaghi hills, 100 kilometres from Tash-Tash. The first parties of workers, engineers and technicians have been sent there, together with mobile power plants, trucks, compressors, drilling equipment and ready-made houses."

"Not far from the temporary settlement for the first construction workers built near Tash-Tash, a fine city is springing up. Several streets are already built, and the other day the first tenants moved into the new houses. A ten-grade school has been opened, and scores of other buildings are in course of construction. About one hundred additional one- and two-storey ready-made houses have just arrived. Dining rooms and restaurants, a clubhouse, a public baths and a cold storage are being built, roads and water mains

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land, and high-tension and telephone lines erected."

The builders will have tremendous tasks to cope with in 1952, when the volume of work will increase at least sixfold. But it may be

taken for granted that they will faithfully fulfil their pledge: the Main Turkmen Canal—this great construction project of peace—will be completed to time, and the Stalin plan for the subjugation of the Kara Kum desert will become a fact.

THE MAIN TURKMEN CANAL

